

# Zero Retries

## Journal of

### The Northwest Amateur Packet Radio Association

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#### Why PACKET?

##### What is Packet Radio?

PACKET RADIO is a means of transmitting binary data (like ASCII) over the radio waves in an almost error free manner. The data is collected from a source such as a computer terminal usually in a serial data stream, and stored by a device referred to as a PACKET ASSEMBLER/DISASSEMBLER (PAD) which is in turn a part of a device called a TERMINAL NODE CONTROLLER (TNC). The PAD then takes the collected data and at the appropriate point encloses it with some additional information including fields for SYNC bits, Flags, Addresses, Control, Data, Cyclic Redundancy Check (CRC), and ending flag.

The address field will contain the callsign of the station for whom this data is intended, the callsign of up to eight stations which will relay this PACKET to its destination. The Control fields tell the receiving station what type of PACKET is being sent to it and how to handle it. The Data field contains the binary information or actual message that is being transmitted. the CRC is used to determine if the data has been received error free.

Once this information has been wrapped around the data which is to be transmitted, the TNC then will key the transmitter and pass the data through a MODEM into the transmitter. The TNC will then listen to the received signals awaiting an acknowledgement packet from the destination station. These transmissions tend to be short bursts and in the course of a QSO, the channel will be used only for a fraction of the time. This will allow the sharing of the frequency. The PAD has the ability to filter out only those stations which the operator wishes to monitor such that the two stations involved in a QSO will have what appears to be a totally clear channel when in fact there may be many QSOs going on concurrently.

##### What is a Packet Radio Network?

A Packet Radio Network can take many forms but we will address basically two: the Local Area Network (LAN), and the Wide Area Network (WAN).

A LAN is the group of stations which share the physical proximity to be able to receive each other's transmissions directly.

It was recognized very early in the development of packet radio networks that VHF/UHF networks were generally limited when confined to a LAN rule so the development of the Digipeater was initiated. A DIGIPEATER will relay messages from two other TNCs that do not have a reliable communications path. This is the beginning of a WAN.

To extend the coverage of these WANs even further a series of experiments are underway. In the Seattle area, Tom Hogan, WB7DCH, has set up a MailBox/BBS/Bridge which allows two WANs, one on 2 meters and another on 220 MHz, to communicate with one another through his Xerox-820 based computer system using software developed by Hank Oredson, W0RL1, of the New England Packet Radio Association (NEPRA).

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Other plans include a true GATEWAY linking a network using one type of protocol to a network using another. This gateway would link Washington and Oregon with the V2 networks in British Columbia. (See "The New Vancouver Protocol", Jan. 1985, "Zero Retries"). Many other WANs and LANs are connected together via the OSCARS and HF. However, the major thrust of the future will be to combine these methods with high-speed 9.6-10M baud intercity trunk systems to form a system called AMPRNET giving 24 hour a day, 7 day a week, digital communications to the amateur community.

##### What do I need to get on Packet?

You will need a transceiver and a terminal or home computer with a terminal emulation program and a serial port that looks something like RS-232C or RS-423 along with associated cables, antennas, etc.

You will also need a TNC from a variety of sources: AEA, GLB, TAPR, Heathkit, VADCG, Bill Ashby and Son, Florida Amateur Digital Communications Association (a mod for Xerox-820), AMRAD, Richcraft (a software package for TRS-80 Models I, III, and 4), and others. The TAPR board is available as a kit from Tucson Amateur Packet Radio, Inc., as a completed unit from AEA, or as a kit from Heathkit.

##### Where is the Activity in the Pacific Northwest?

In most of the country 145.01 MHz is the primary calling frequency for packet. But until the snows stop flying, and the boys can reach the mountain tops of the Cascades 147.6 serves as the hub of our packet activity. Other frequencies recommended by NAPRA are 145.03, .05, .07, and .09. V2 protocol packet can be found on 145.65 MHz in SW British Columbia and NW Washington. All of these frequencies utilize 1200 baud.

On 220 MHz, activity can be found on 224.56 with 223.56, .58, and .60 planned for 1200-1800 baud LANs. We are asking that 220.50-.60 MHz be reserved for 9600 and 56K baud trunking systems with additional 100 KHz channels in the future.

On 6 meters there is some activity outside the local area at 50.505 MHz. We will be watching 6 meters very closely for possible experimentation.

Robert "Gervie" Gervenack, W7FEN, and others are experimenting with 300-baud Packet at 3.607 MHz, there are several W0RL1 type BRIDGE/CBMS systems on 20 meters around 14.103 MHz. 30 meters is very popular for experimentation, and there is activity on most of the HF bands near the RTTY frequencies.

##### Who will Help Me?

In the coverage area of the BEARS repeater in Seattle, you can get help from the NAPRA Packet Radio Ragchew Net which meets every Thursday night at 2100 PST/PDT on 145.33 MHz. Also if you will contact NAPRA, we will attempt to put you in touch with someone with a similar TNC in your area.

John D. Hays, KD7JW

To NAPRA  
From: N7BTI  
Subject: TAPR Mtg, Tucson, 2-9-85

Have just returned from the TAPR meeting which was held in a motel in Tucson. Larry, WB7USL and I were both there. Went to a pizza bash Friday nite and a beer and ? Sat nite; left on Sunday as the only thing happening was the closed TAPR board meeting.

Attendees were about 50 strong, and were mostly the officers and members of the many nationwide clubs. Several of the "mover and shaker crowd" were present. Those I can remember were Lyle Johnson the TAPR pres, Pete Eaton TAPR ex-VP, Harold Price PACSAT boss, Tom Clark AMSAT Pres, Chuck Green TAPR treas, Mike Brock TAPR board member, Pat Snyder the v PSR guy, Jeff Ward the Gateway guy, the software designers of the TNC Dan/Margaret Morrison and Dave Henderson, Compuserve Hamnet guy, head of Army MARS, Steve Goode from the Chicago group who demoed his 9600 baud RF modem, Andy Freeborne from Colorado and a board member, etc.

Dave Pederson from the Utah club was present. Their newsletter is UPRR Connect. They are running a voice net, and are using the RTTY freq in town. They will putup an 820 base digipeater in the summer. The reason for singling them out is that they would be willing to put a digi in Boise to talk to NAPRA. It may be possible to connect to Pullman from there. Someone ought to get to Dave and talk.

Pete Eaton has located a Radio Shack book that is good on digital; Radio Shack "Understanding Data Communications" \$3.95. It was developed by the TI Learning Center - I looked and it isn't bad. Part number is 621389.

I purchased a Radio Shack P/N 10053214-2 Power supply for a few bucks and have the 4 page set of instructions for changing its -5 volt to -12 volt. It allows use of the TAPR board on 12 v DC. I will resell it at cost to anyone interested. I also purchased a PC board and instructions for the "FAD" board and will resell it at its \$25 cost. Has instructions, schematics, parts list etc. This is a board which interfaces with the 820 and provides 2 ports. It contains a 6 MHz 28530A which provides HDLC at the port, and drives a modem directly. The board was designed for the eventual purpose of linking. You would for instance place a 9600 baud modem feeding 220 on one port and a similar setup on the other feeding 2 meters. Or you could interface to HF which I think the national clubs badly need to do so they can talk to each other. You pull and jumper across the 820 GP10 parallel port chip. The parallel port was designed for printer. The FAD (frame assemble disassemble) board then hangs on the 820 buss. Howie Goldstein has the software for linking

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about done. This is a different approach than the John Bloom idea which is discussed below.

Met Jeff Ward, the Gateway editor. He has, free, John Bloom's 8" disc and schematic for a two port interface for the 820. His premise is that because remote TNCs can't hear each other, they will transmit and CSMA won't work, causing collisions. The purpose of the 820 in this case would be a two port digipeater operating on two different frequencies so that TNCs that can't hear each other would access different ports on different frequencies. It's essentially a move to set up different LANs on different frequencies and which are physically adjacent to each other. The guys in one LAN who are on one frequency together should all be able to hear each other so their CSMA will work.

KE3Z has developed this software and hardware, which constitutes a packet SIO-Modem interface for the Xerox 820-1. It contains a 2716 and a 374 latch and provides for phase locked loop clock recovery and NRZI handling. It is much cheaper than the FAD approach where the 6MHz 28530A cost maybe \$35. The software on the 8" disc provides for a two port digipeater.

John Bloom also is "down" on the FAD approach and GATOR net as it is not upgradable in his mind to level 3 and all the later neat things that will happen. He says we should also consider Phil Karn's software for the 820 which provides two port-ability.

I gave a talk about the AEA PKT-1, and later in the day, one about NAPRA, using overhead techniques. Covered who is in the group, an idea of our present geographical coverage, descriptions of the bulletin boards and the 2m-220 link they support and described our interest in the forwarding capability of the new software.

Talked a bit about HF and Oscar and how we hope to expand that. I went into the thoughts about how to connect to the East, South, and North and put white and blue yarn on a big map showing where we do have paths and where we hope to.

Wayne Wilson, Heath's Am. Radio marketing manager gave a talk on the HD4040, their copy of the TAPR board. It will be \$299.95 and delivery will be in April from their new catalog. It is a kit, with the components sequenced on tape in the order you will use them. The board is a DIRECT copy of the TAPR (ie the switches are still a DIP on the board, and the only thing brought to the front is the LEDs. The back has the lineup of TAPR connectors. The case is not as tall as the AEA. They have mounted a power transformer from 115 at the end of the board in the case, along with a line filter. No 12 VDC capability was included, although it is promised someday. I haven't seen the manual-Wayne said it would be tough to improve on the TAPR manual. Heath has mostly a customer base of computer folks and will primarily try to teach them how to be hams, as opposed to going after hams and

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trying to convert to packet.

There seemed to be a unifying thread in most of the club presentations - that they are not yet in touch with other LANS via VHF in most cases and that Oscar is expensive to get into, and that it would be nice to have a forwarding BB on HF, with connects to other LANS. We should try to judge this need as opposed to using Oscar. Might be nice to have both.

It was a good meeting. I think Larry and I both were invigorated.

John Gates N7BTI

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cmd:DCH AT LARGE

In the absence of any feedback with regard to the content of the last issue of Zero Retries, I consider myself at liberty to wax poetic on my favorite subjects - MailBoxes and networking. Why am I so intrigued with MailBoxes? Because they provide the capability at Level 2 to accomplish quite a few Level 3 networking functions while the Level 3 protocol is being hammered out.

By now, most of you have used the WORLI MailBox/GateWay running at WB7DCH and understand in general how it works. Suppose we added a feature which allowed you to tell the MailBox that you wish to receive all of your mail at the WB7DCH MailBox. Let's group all of these calls together into a list and call it the "U" (for User) list. Let's suppose also that the WB7DCH MailBox and the other MailBoxes each had a list of adjacent MailBoxes in the network; call them the "I" (for interrogate) lists.

With these two lists, the "U" list and the "I" list, automatic networking can be accomplished! How? By using the "I" list, each MailBox can periodically interrogate each adjacent MailBox and download its local "U" list. By this procedure, a MailBox can generate "F" (for Forwarding) lists.

The "F" lists are lists of stations for whom a MailBox should forward mail, grouped by the calls of the MailBox to which their mail should be forwarded. If, once per hour, a MailBox attempts to forward mail addressed to stations on its "F" lists, we have automatic networking!

Now, let's consider what it would take to make the operation completely automatic and self-perpetuating. The "U" list could be generated from the CALLS.TNC file which each MailBox maintains. How can we generate the "I" list automatically? One way might be for each MailBox to use a standard beacon that can be recognized by other MailBoxes, for example "WB7DCH MAIL4:". The "F" lists can be generated as previously described. Admittedly, there are still a few details to be worked out such as the method by which each MailBox gets the path information for reaching adjacent MailBoxes. Another consideration is the probable need to change certain TNC parameters (FRACK, MAXFRAME, etc.) when connecting to adjacent MailBoxes during forwarding attempts. Values for these parameters can be calculated once the appropriate path information has been obtained. Where are we today? The current WORLI software running at WB7DCH

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requires the Sysop (me) to put together the "F" lists. The "P" lists, for changing TNC parameters must also be put in by hand.

The "U" and "I" lists are not used at present. But the software works! It is in operation at four or five stations in the Northeast, and forwarding can be done on either side of or through the GateWay!

That's the good news... The bad news is that the WB7DCH MailBox/GateWay is the only system running the WORLI software in the Pacific Northwest. Other experimenters have purchased Xerox 820 boards but are not yet on the air with them.

But all is not lost! The forwarding of messages counts only on the remote system behaving properly. It must have a menu with ">" at the end of the last line. The command for sending messages must be of the form "Sx call". It must prompt for the message title and then prompt for the message text. The message text must be terminated with a control-Z.

That's all there is to it. Anyone out there feel like scribbling a little code and trying a few experiments?

Tom Hogan, WB7DCH

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cmd:PREZ SEZ ...

Welcome to 1985, the year of packet networking. Just what is a network anyway? Well, our operation on 147.60 MHz is a Local Area Network (LAN) and so is the one on 224.56 MHz a LAN. So, who or what makes up a LAN? You do! That is to say your radio and TNC does. It is important to remember that your station is a part of the network no matter if you are there or not. By leaving your station on all the time it will help outlying stations use you as a digipeater to gain access to the LAN.

Another point to remember is that direct connects on LANS with hill top digipeaters in essence stops these digipeaters from being used by others. This is due to the fact that a digipeater will not hear others if it can hear you at the same time. It is better to use the hill top digipeater to make initial contact and then QSY to another packet frequency. This only makes sense and will lesson the traffic loading on hill top digipeater LANS.

What other frequencies should one use? Well, we should try to use 145.01 MHz, .03, .05, .07, .09 and 223.56 MHz, .58, .60 at present. It should be remembered that some of these frequencies will have hill top digipeaters on them in the future. While others will be purposely left without hill top digipeaters on them so that they can be used for direct connects. The actual high digipeater versus geographical coverage issue is still undecided at present. It is a very important issue because it sets the tone for how our network grows and how much growing pains it will have.

These issues of what frequencies we should use, network operating procedures, etc. is a vast unknown at present. What will help fill in the void is your participation in the decision making process. This will take place in the club's committees. Hope to see you there.

Dennis Goodwin, KB7DZ  
President of NAPRA

#### cad:ABOUT THIS ISSUE

The weeks between this issue and our first have been long and busy for us. Rather than put a February date-line on it we have tried to cover March as well. This will give us a chance to start out on number three and not feel that it is already two weeks late! Thanks for your patience.

On page one, John, KD7UM presents an excellent discription of packet radio and at the same time highlights some of the activity in NAPRA land. The article is an extraction from a longer piece that he has put together to handout at packet demonstrations. Other hand-outs are available, as well as good overhead transparencies. If you are part of a packet demo check with him. These materials can be made available to you.

John and Larry, N7BTI and WB7USL, attended the big TAPR meeting in Tucson last month. Those who attended the February board meeting heard them enthusiastically describe their trip. You can find out what was going on down in cactusville on page 2 and 3.

Games on 220 packet! It was bound to happen sooner or later. Budd, WB7FHC, describes this and other adventures with what he calls "packet-smart" software on page 5. And just for fun we have added a column called "The Other Side of the MailBox" to keep you 2 meter packeteers tempted to bridge your way onto the 220 side and see what's going on. John, W7KKN, yanks the "lime slime" tube from his new Model 4 and goes "amber with caution". The instructions for the switch could have been part of the Sunday Funnies. John's QTH is halfway up the hill from an ASARCO mill. He lives in a part of Tacoma he calls: Sulphur City.

Our own HF packet enthusiast, Gervie, W7FEN, offers a modification that the GLB boys might find handy. We'll squeeze his schematic in somewhere, even if it has to go on the back side of the mailer!

Tom, WB7DCH, offers an interesting challenge on page 3. MailBoxes that automatically pass traffic among themselves. But you can read these for yourself.

Remember: feel free to copy any or all of this newsletter and share it with others. We ask that any reprinted material will credit both the author and NAPRA's own: "Zero-Retrieves".

HAPPY PACKETS!

#### cad:PACKET IN OREGON

Peter Dahl, WA7FUS, and my self had an opportunity to attend an educators computer conference in Eugene, Oregon in mid February. We were reluctant to drag packet equipment down there with us, but we did scare up a lot of packeteers while we were south of the Columbia.

In Eugene, we dialed up 145.01 Mhz and gave a shout voice on the local packet frequency. Bob, WB7NBE, must have been monitoring just down the street, because he came booming back to us and steared us over to a local 2 meter repeater where we talked at length with several packeteers. The fellows lacked mountain top digipeaters at the time, but plans were in the works to get one up on Praire Peak as soon as the weather would permit. It will be located 25 miles northwest of Eugene and promises to give them good coverage. They hope to be able to reach Mount Ashland to the south and Salem, if not Portland to the north.

On our trip home, we found K7IFG, Jim Dawson, in Portland using the same technique of calling on the packet frequency. Jim has an excellent site that pushes packets well into the southern portion of Washington. We worked him simplex in the car almost as far north as Centralia/Chehalis. Jim mentioned that when the inversions permit, he has packet QSOs with Al Kinder, K7KNZ, in Olympia. He says that nightly he points his beam to the north and pumps out a beacon hoping to digipeat into our WAN via K7KNZ.

There was quite a bit of enthusiasm on the part of the Oregonians. There numbers are still small compared to what is going on up here, but they are growing.

Many of them are running a TNC called: The Salem Board. Jim, WA7ARI, has made some modifications to the design of the GLB. The board may be a bit controversial. Hams that we talked to did indicate that they were not sure that the ROMS in the Salem Board would survive close scrutiny by a copyright court. In response to this, advocates of the Salem Board tell us that the software may be in the public domain and actually the creation of Richcraft. We will watch this issue closely and try to keep you informed.

Budd Churchward, WB7FHC

#### cad:!!! WHAT'S DIGIPEATING?

While eavesdropping on a few of the discussions which took place after the February NAPRA meeting, it dawned on me that quite a number of our members really don't understand how digipeating works. Perhaps a simple example will clear things up. Let's suppose I want to have a QSO with John, N7BTI up in Lynnwood from my station here in Enumclaw. I can't work him direct so I will have to digipeat through WB6VAC on Rattlesnake Ridge.

After I establish the connection, here is what happens as I send each packet. After I enter the carriage return, the packet is transmitted to WB6VAC. If my packet is received correctly by WB6VAC, it is retransmitted addressed to N7BTI. WB6VAC DOES NOT ACK MY PACKET! If my packet is received correctly at N7BTI, He transmits an ACK back to me via WB6VAC. If the ACK is received correctly by WB6VAC, it is retransmitted addressed to me.

What this means is that my packet has two opportunities to get "stepped on" enroute to N7BTI and his ACK has two opportunities to get "stepped on" on its way back to me. WB6VAC does not look for an ACK from N7BTI.

What does my TNC do during all this time? Well, when it transmits the packet to N7BTI via WB6VAC, it does a calculation based on the number of hops (in this case 1), adds an extra time margin, and if an ACK is not received within the calculated time, it makes a decision to retransmit the packet.

Now, add to this the fact that most of us run with the TAPR default of MAXFRAME = 4, which means that we can have up to four frames(packets) in flight at once. If an ACK is missed, it can be necessary to retransmit all four frames! Since I can't hear N7BTI direct, and WB6VAC can hear both of us, and if you throw in a little local chatter IT'S POSSIBLE FOR ME TO "STEP ON" MYSELF! Isn't it nifty that it works as well as it does?

## PACKET-SMART TERMINALS

When the group in Tucson put together their first packet boards they felt the need to be sure that their TNCs would work with almost any terminal and almost any transceiver. Having met that goal they have watched packet radio grow.

The time has come, though, that we look at the software that we have chosen to run our terminals and consider what features are needed specifically for packet radio. We need to go beyond the dumb or smart terminal software that has been borrowed from the landline users and seek programs that will respond to the TNC and communicate with it for us.

Several people have asked that certain features be added to the TNCs, like automatic responses when someone calls and automatic disconnect if no activity is detected after a certain period of time. Most of the requests are things that can be done by a "packet-smart" terminal. And the truth is, we ask the TNC to do more than it should. Many of these tasks are the responsibility of the terminal software.

Our own local MailBox/Gateway is an example of a "packet-smart" terminal program. It sets up two TNCs as "server nodes" that can be used by us. Linking, message storage, and message retrieval are all features that we know and use. In addition to these, that software keeps a log of all its own activity, "listens" to the band and maintains a list of all the different stations that are "heard" on the frequency (whether they check into the MailBox or not!), and compiles statistics about the users and times of service they request.

Similar programs, meeting the less ambitious needs of ordinary users, can be written for almost any computer. Hackers familiar with "hybrid programming", the intermixing of high speed machine code with high level programming languages, will discover that "packet-smart" programs can be written even in BASIC.

The chat general QSO mode that is popular with many of us allows for long periods of time between transmission of packets. The same feature will also give a slower language list BASIC time to handle even sophisticated disk routines without the loss of any data. To guarantee that text does not fall through the cracks, procedures (or subroutines) that will consume your computer's time should begin and end by sending the appropriate flow control code to the TNC. These control codes, usually CTRL-S and CTRL-Q, regulate the flow of data from the TNC to your computer in the same way a faucet is used to fill a dozen glasses without spilling any water.

The parallel user's port on the TAPR board (available for the AEA) can provide quite a bit of information about the state of the TNC. But if the programmer is reluctant to write routines that access the computer's I/O ports, advantage may be taken of the fact that the Tucson type TNCs precede all their reports with "###". The software should watch for these stars and be prepared to decode the report that follows. Care will need to be taken that "false reports", stars that are sent by in the actual transmissions, do not crash the computer. The GLB uses a different means of reporting, but it too can be

decoded.

Experimenting with packet-smart terminal software has been very rewarding. The station that I am running makes use of a British Broadcasting Corporation ACORN computer. The ACORN provides me with a version of BASIC that is very similar to Pascal. I appreciate the ease of working in this language and find that utilizing the structure of a sophisticated language like Pascal superior to the haphazard code too common in other BASIC programs. It was always my intention to test procedures in this structured BASIC and then re-write the routines in machine code. Much to my surprise I have found that I can run the terminal at 1200 baud with no noticeable degradation. So far I have not found a need to convert to machine code.

Features that I have found very handy in the packet-smart terminal include most of the goodies that come from outstanding land-line terminal programs. These include file transfer and capture routines. A lengthy type-ahead buffer allows me to prepare text while watching packets arrive from the other station. This works because of two easily defined text windows. Twenty lines have been set aside at the top of the screen for incoming communications. Five lines at the bottom of the screen show me my own text as I prepare it.

Whenever a station connects to me, the call is logged to a file on disk. Stations that connect while I am away from the keyboard will automatically receive a message in the form of a menu. The options include: leave a message, play a computer game, page the operator by sounding off a "STAR WARS" alarm, or simply quit and try later.

Text being received is not interrupted by "request to connect messages" instead these are filtered out and replaced by a computer generated synthesized speech announcing the call of the intruder. Connect and disconnect messages are also joined by speech.

The computer game feature has been an interesting experiment and, I am sure, added to load on the 220 network. My intention was to discover what kind of control I could release to the guy on the end of the path and still maintain a secure system. It involves disk access and full interaction with the computer. Extensive error trapping has been required. I publicly apologize for the 38K of ^Q^Ss that were dumped into the network in the wee hours of the morning during the weeks that this software was being developed.

It is easy to see that software like this could easily expand into a Mailbox or BDC. I am hoping that this will not be the case. When it does your computer becomes, as WB7DCH puts it, "a public utility" and you have to stand in line to use your own equipment.

This packet-smart software is available to others who use the ACORN. But request by owners of other computers or similar software are common. The process of creating good software involves hours and hours of hard work. Those who rely on others to provide them with "packet-smart" terminals may have to wait a long time for that software to come along. We need to encourage those who are willing and capable of such projects. And remember: Pirates who copy and illegally distribute their work discourage the good programmers from taking on such projects.

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Budd Churchward, WB7FHC

## THE OTHER SIDE OF THE MAILBOX

cmd:Link state is: CONNECTED to W7KKN VIA N78TI

An amber tube was recently installed in this station's Model 4, and the instruction sheets supplied by the vendor, Lambert - St. Clair, of New Joisey seems worthy of comment. They were well written, with enough humor attached so that one was encouraged to read them through, rather than pursue the standard ham practice of "do it first, and if all else fails etc". Too often these manuals seem to be written primarily to impress other PHD's, rather than aid the hapless user. To quote a few typical lines -

"High voltages may be present inside your computer .... If you are unsure of your ability to proceed, then stop now and contact a competent technician ... (this message brought to you by our insurance company)." Further along, toward the end of the project, this sage advice - "Now for the tricky part. Plug in the computer and turn it on. Get hands, tools, dogs, cats, kids and your lunch out of there. High voltage will be present". The last shot is "So sit back and enjoy. We really appreciate your business ... and will do just about anything to keep our customers satisfied but just because you bought a tube does not qualify you for use of the company car".

Such writing is refreshing to find in this business (Tektronics, et al pse copy) and makes life a bit easier for all of us.

Onward & Downward de W7KKN, John, Suplhur City

## IN THE MAILBOX

cmd:\*\*\*GRAPES

"First Georgia Packet Radio Directory and Operations Manual"

GRAPES (Georgia Radio Amateur Packet Enthusiasts Society) has still another announcement out in the mail. This time it is an interesting list of all the packet users in the Georgia, Alabama, and Florida areas. The list includes over 145 known packet radio stations on the air as of February 1, 1985! The list is being compiled to form a tri state data base that will be used for path finding software.

Another list identifies 14 Wide Area Digipeters in Georgia and Florida. Included in a list of five PBBS MailBox Systems are two WORLI systems. One is in south Georgia and another in Atlanta.

The following "gentleman's agreement" was included in the flyer:

### GOOD LAN OPERATING PROCEDURES:

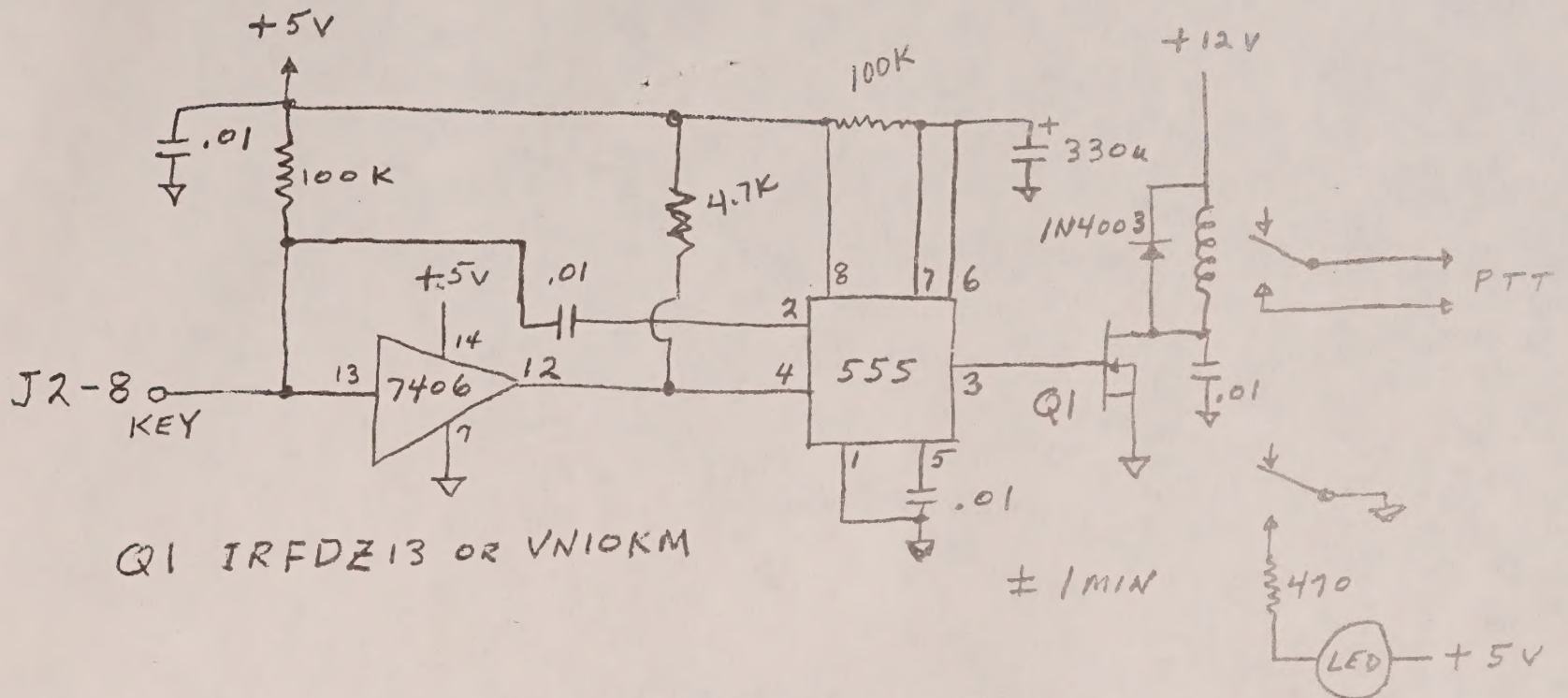
TXD 8  
TURN CWID OFF (PERM)  
BEACON ONCE EVERY 30 MINUTES MAXIMUM IF AT ALL  
DO NOT BEACON THRU MORE MORE THAN ONE DIGIPEATER UNLESS IMPORTANT TO ALL  
ON 145.01 CHOOSE THE MOST EFFICIENT DIGIPEATER ROUTE OR DIRECT CONNECT  
IF DIRECT CONNECT POSSIBLE MOVE TO 03,05,07,09  
USE BBS ETC AT NON-PEAK "CHAT" TIMES

## Membership Application Request Form

Name \_\_\_\_\_ Callsign \_\_\_\_\_ Class \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ ZIP \_\_\_\_\_  
Phone \_\_\_\_\_ (Days) \_\_\_\_\_ (Eves) \_\_\_\_\_  
May we publish the above information or a part thereof? \_\_\_\_\_  
Comments \_\_\_\_\_

\_\_\_\_\_ I have enclosed \$15.00 annual dues. \_\_\_\_\_ I have a packet station  
\_\_\_\_\_ I will send dues with Application. \_\_\_\_\_ I am on the Air.  
Send with a SASE (legal size preferred) to:

NAPRA  
c/o Budd Churchward, WB7FHC  
13304 131ST STREET KPN  
Gig Harbor, Washington 98335



CIRCUIT TO ADD WATCHDOG

AND RELAY FOR PTT TO GLB.

ROBERT W. GERVENACK  
W7FEN

2-5-85

TO ADD A RELAY TO THE TAPR TNC FOR RADIOS  
WITH (-) PTT LIN.  
OPEN TRACE AT J3 PIN 4

REMOVE D19

ADD A WIRE TO TRACE AT Q1, D TO RELAY COIL.  
OTHER SIDE OF COIL TO +12V.

ADD A WIRE TO J3 PIN 4 TO RELAY CONTACT.  
OTHER RELAY CONTACT TO GROUND.

BE SURE A 1N4003 DIODE IS ACROSS THE  
RELAY COIL.

SEE ABOVE CIRCUIT FOR GLB.

ROBERT W. GERVENACK  
W7FEN

2-7-85

Northwest Amateur Packet Radio Association  
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